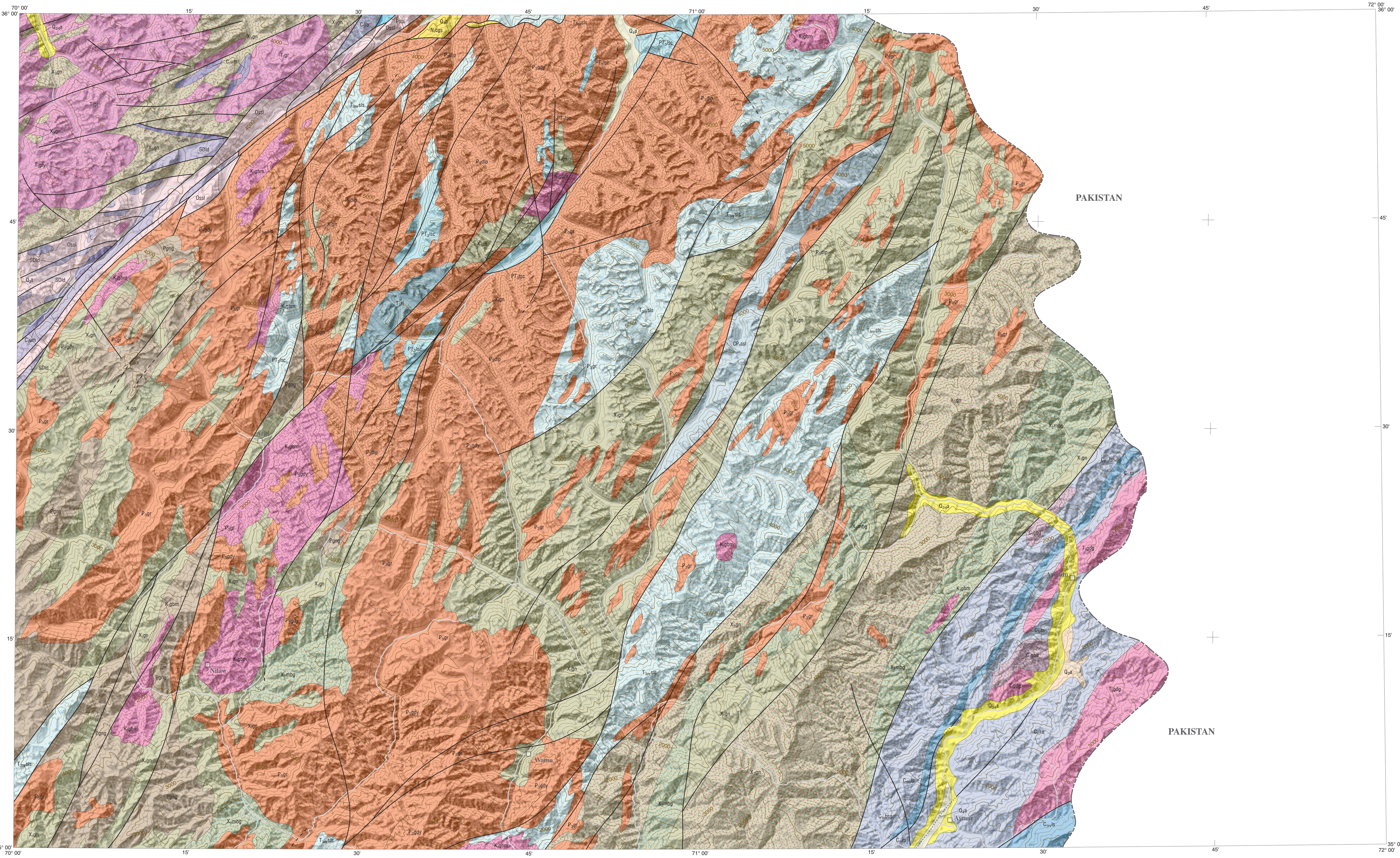
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

AFGHAN GEOLOGICAL SURVEY
Prepared in cooperation with the U.S. Geological Survey and the Afghanistan Geodesy and Cartography Head Office
Under the auspices of the U.S. Agency for International Development and the U.S. Trade and Development Agency

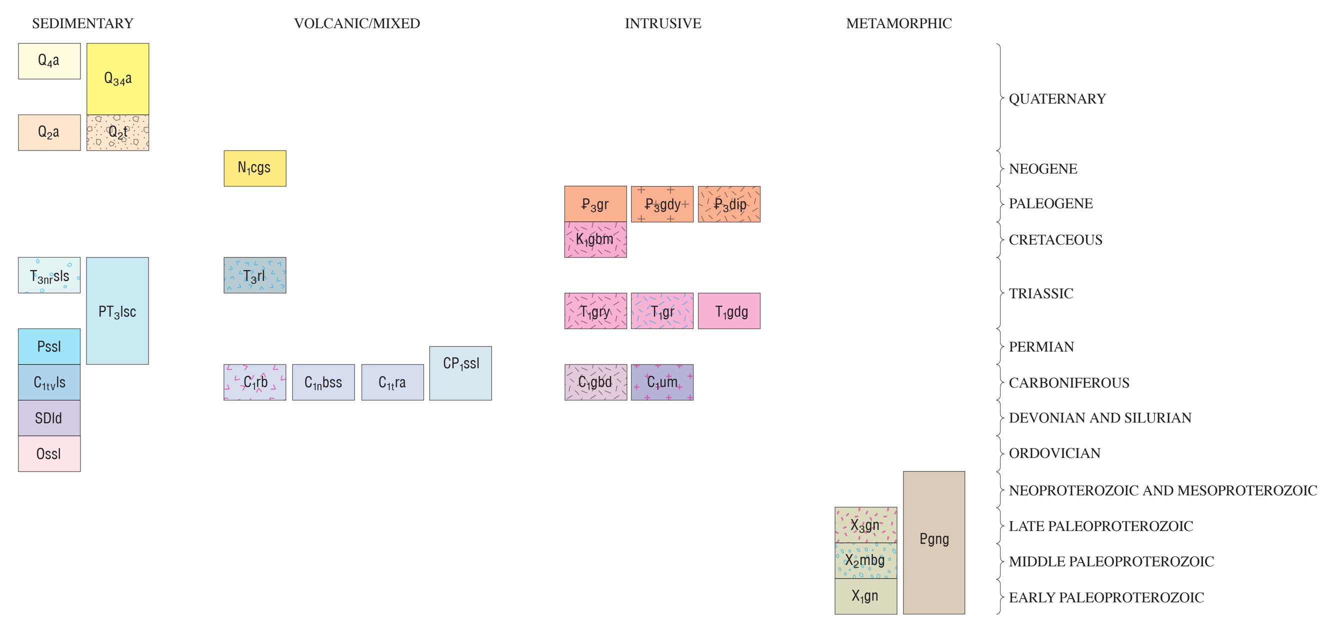
USGS OPEN-FILE REPORT 2005-1102-A
AGS OPEN-FILE REPORT (505/506) 2005-1102-A
USGS Afghanistan Project Product No. 008



Base from Shuttle Radar Topography Mission (SRTM) 85-meter digital data
Cultural data from digital files from AIMS Web site (http://www.aims.org.af)
Projection: Universal Transverse Mercator, zone 42, WGS 84 Datum

SCALE 1:250 000
5 0 5 10 15 20 25 30 35 40 KILOMETERS
5 0 5 10 15 20 MILES
CONTOUR INTERVAL 250 METERS

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

Q_4a **Conglomerate and sandstone (Holocene)**—Alluvium: shingly and detrital sediments, gravel, sand more abundant than silt and clay

$Q_{34}a$ **Conglomerate and sandstone (Holocene and late Pleistocene)**—Alluvium: shingly and detrital sediments, gravel, sand more abundant than silt and clay

Q_2a **Conglomerate and sandstone (middle Pleistocene)**—Alluvium: shingly and detrital sediments, gravel, sand more abundant than silt and clay

Q_2t **Till (middle Pleistocene)**—Till: conglomerate, shingly sediments, gravel, sand, siltstone, breccia

N_1cgs **Conglomerate and sandstone (Miocene)**—Red conglomerate, sandstone more abundant than siltstone, clay; acid and mafic volcanic rocks; limestone, marl; olivine basalt, trachybasalt, andesitic basalt (Taywara Series)

$₽_3gr$ **Granite (Oligocene)**—Granite (Phase III)

$₽_3gdy$ **Granodiorite and granosyenite (Oligocene)**—Granodiorite, alaskite, granosyenite more abundant than granite (Phase II)

$₽_3dip$ **Diorite and plagiogranite (Oligocene)**—Diorite and plagiogranite more abundant than granodiorite (Phase I)

K_1gbm **Gabbro and monzonite (Early Cretaceous)**—Gabbro, monzonite more abundant than diorite, granodiorite

T_3rl **Rhyolite lava (Late Triassic)**—Shale more abundant than phyllite, andesite to basalt (greenstone altered), limestone (Kotagai Series)

$T_{3nr}sls$ **Siltstone and sandstone (Late Triassic (Rhaetian and Norian))**—Siltstone, sandstone more abundant than shale, conglomerate

T_1gry **Granite and granosyenite (Early Triassic)**—Granite, granosyenite (Phase IV)

T_1gr **Granite (Early Triassic)**—Granite (Phase III)

T_1gdg **Granodiorite and granite (Early Triassic)**—Granodiorite, granite (Phase I-II)

PT_3lsc **Limestone and chert (Late Triassic (Carnian) to Permian)**—Limestone, marl, chert more abundant than sandstone, shale, siltstone

Pssl **Sandstone and siltstone (Permian)**—Red and variegated sandstone and siltstone more abundant than mudstone, conglomerate, gravelstone

CP_1ssl **Sandstone and siltstone (Early Permian and Carbonifeous)**—Sandstone and siltstone more abundant than slate, andesite to basalt volcanic rocks

C_1gbd **Gabbro and diorite (Early Carboniferous)**—Gabbro, diorite

C_1um **Ultramafic intrusions (Early Carboniferous)**—Dunite, peridotite, serpentinite

C_1rb **Rhyolite to basalt (Early Carboniferous)**—Rhyolite to basalt volcanic rocks more abundant than limestone, slate, sandstone, conglomerate

$C_{1n}bss$ **Basalt and sandstone (Early Carboniferous (Namurian))**—Basalt, sandstone, siltstone, shale

$C_{1tv}ls$ **Limestone (Early Carboniferous (Visean and late Tournaisian))**— Limestone more abundant than slate, sandstone, mudstone, conglomerate

$C_{1t}ra$ **Rhyolite to andesite (Early Carboniferous (early Tournaisian))**—Rhyolite to andesite (greenstone altered) more abundant than sandstone, shale, siltstone

SDld **Limestone and dolomite (Devonian and Silurian)**—Limestone and dolomite more abundant than schist, sandstone

Ossl **Sandstone and siltstone (Ordovician)**—Limestone, sandstone, siltstone, shale

Pgng **Gneiss and granite (Proterozoic)**—Gneiss-granite, granite, plagiogranite

X_3gn **Gneiss (Late Paleoproterozoic)**—Biotite and garnet-biotite gneiss; schist, quartzite, marble, amphibolite

X_2mbg **Marble and gneiss (Middle Paleoproterozoic)**—Marble, biotite gneiss, and garnet-staurolite-biotite gneiss; schist, quartzite, amphibolite

X_1gn **Gneiss (Early Paleoproterozoic)**—Two-mica, biotite, biotite-amphibole, garnet-biotite, garnet-sillimanite-biotite, pyroxene-amphibole, plagioclase, and cordierite gneiss; schist, migmatite, quartzite, marble, amphibolite

EXPLANATION OF MAP SYMBOLS

Contact

Fault—Dashed where approximately located; dotted where concealed

DATA SUMMARY

This map was produced from several larger digital datasets. Topography was derived from Shuttle Radar Topography Mission (SRTM) 85-meter digital data. Gaps in the original dataset were filled with data digitized from contours on 1:200,000-scale Soviet General Staff Sheets (1978–1997). Contours were generated by cubic convolution averaged over four pixels using TNTmips[1] surface-modeling capabilities. Cultural data were extracted from files downloaded from the Afghanistan Information Management Service (AIMS) Web site (http://www.aims.org.af). The AIMS files were originally derived from maps produced by the Afghanistan Geodesy and Cartography Head Office (AGCHO). Geologic data and the international boundary of Afghanistan were taken directly from Abdullah and Chmyriov (1977).

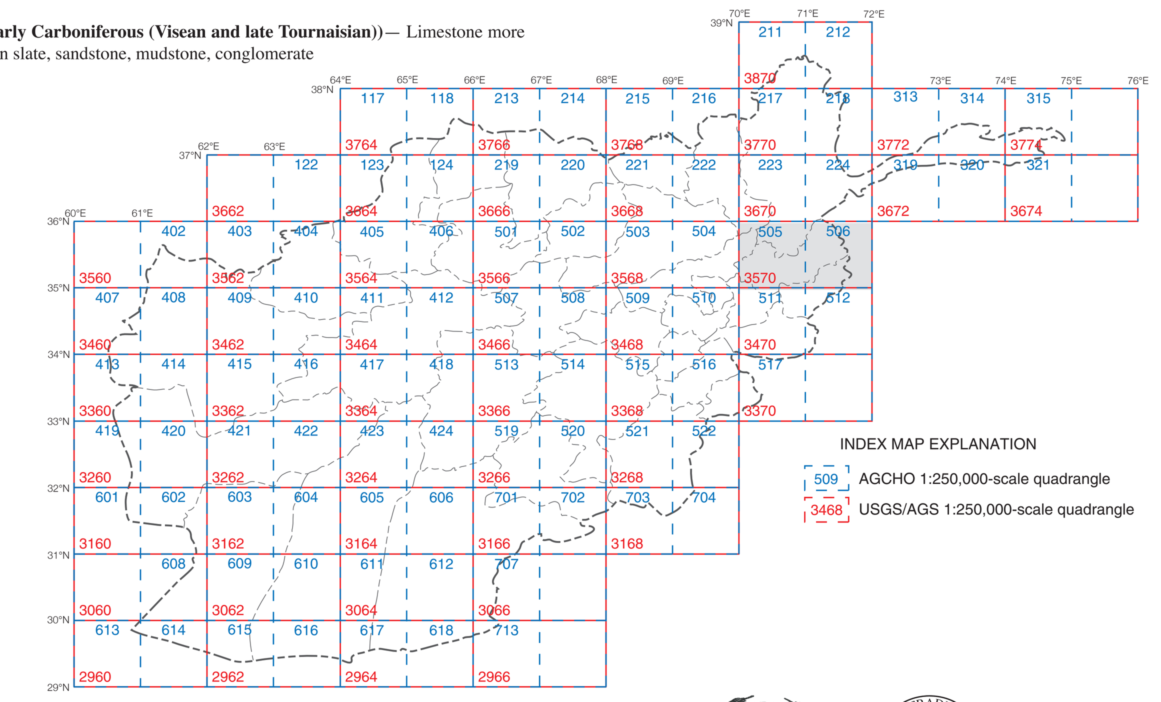
It is the primary intent of the U.S. Geological Survey (USGS) to present the geologic data in a useful format while making them publicly available. These data represent the state of geologic mapping in Afghanistan as of 2005, although the original map was released in the late 1970s (Abdullah and Chmyriov, 1977). The USGS has made no attempt to modify original geologic map-unit boundaries and faults; however, modifications to map-unit symbology, and minor modifications to map-unit descriptions, have been made to clarify lithostratigraphy and to modernize terminology. The generation of a Correlation of Map Units (CMU) diagram required interpretation of the original data, because no CMU diagram was presented by Abdullah and Chmyriov (1977).

This map is part of a series that includes a geologic map, a topographic map, a Landsat natural-color-image map, and a Landsat false-color-image map for the USGS/AGS (Afghan Geological Survey) quadrangles shown on the index map. The maps for any given quadrangle have the same open-file number but a different letter suffix, namely, -A, -B, -C, and -D for the geologic, topographic, Landsat natural-color, and Landsat false-color maps, respectively. The present map series is to be followed by a second series, in which the geology is reinterpreted on the basis of analysis of remote-sensing data, limited fieldwork, and library research. The second series is to be produced by the USGS in cooperation with the AGS and AGCHO.

REFERENCE CITED

Abdullah, Sh., and Chmyriov, V.M., eds., 1977, Map of mineral resources of Afghanistan: Kabul, Ministry of Mines and Industries of the Democratic Republic of Afghanistan, Department of Geological and Mineral Survey, V/O “Technoexport” USSR, scale 1:500,000.

[1]Geospatial analysis software developed by MicroImages, Inc., Lincoln, NE 68508-2010.



INDEX MAP EXPLANATION
509 AGCHO 1:250,000-scale quadrangle
3468 USGS/AGS 1:250,000-scale quadrangle

GEOLOGIC MAP OF QUADRANGLE 3570, TAGAB-E-MUNJAN (505) AND ASMAR-KAMDESH (506) QUADRANGLES, AFGHANISTAN

Compiled by
Charles R. Lindsay, Lawrence W. Snee, Robert G. Bohannon, Ronald R. Wahl, and David A. Sawyer

2005